

**AMMONOENCYRTUS CAROLINENSIS, N. COMB. (HYMENOPTERA:
ENCYRTIDAE), A PARASITE OF LOBATE LAC SCALE
PARATACHARDINA LOBATA (CHAMBERLIN) (HEMIPTERA: KERIIDAE)**

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Abstract.—*Ammonoencyrtus carolinensis* (Meyer) (**n. comb.**) (Hymenoptera: Encyrtidae) a parasite of lobate lac scale, *Paratachardina lobata* (Chamberlin) (Hemiptera: Keriidae), is distinguished from other species of *Ammonoencyrtus*, and a diagnosis and summary of its known biology are given. *Ammonoencyrtus carolinensis* was previously reported attacking *Mesolecanium nigrofasciatum* (Coccidae). Parasitization of Keriidae is an unusual host shift for this group of parasitoids.

Key Words: Encyrtidae, Keriidae, *Ammonoencyrtus*, *Paratachardina*, taxonomy, parasitoid, Hymenoptera

The lobate lac scale, *Paratachardina lobata* (Chamberlin) (Hemiptera, Keriidae), was discovered in Florida in 1999 (Hamon 2001). A potentially devastating pest of trees and shrubs, this introduced scale attacks plants in 49 families (Pemberton 2003) and has spread quickly across a large section of southern Florida and has become a great concern to growers and homeowners because of its broad host range. Economically important hosts include both ornamentals, such as hibiscus, and fruit trees, such as citrus and mango. There is also great concern about the effect that the scale may have on natural areas and the ecology of the Everglades because *P. lobata* can attack many native plants. The Agricultural Research Service, USDA, and the University of Florida, in cooperation with the Florida Department of Agriculture and Consumer Services, Division of Plant Industry (DPI), are conducting research to find out more about the scale and its natural enemies.

Early in 2003, I received specimens for identification of an encyrtid that had been reared by University of Florida scientists from the lobate lac scale. Tentatively identified as *Ammonoencyrtus* sp., these specimens were compared with the other described species in the genus, and I determined that they were not conspecific with *A. californicus* (Compere) or *A. bonariensis* (Brèthes), the only two species placed in this genus. Further study with the aid of Dr. John Noyes of The Natural History Museum, London (BMNH), indicated that the lobate lac scale parasite agreed with the description of *Anicetus carolinensis* Meyer (Meyer et al. 2001). However, there were no records of any encyrtids reared from Keriidae in North America. Lobate lac scale is native to India and Sri Lanka (Hamon 2001, Miller and Ben-Dov 2002). Upon study of paratypes of *A. carolinensis*, it was determined that specimens from the lac scale were conspecific. Therefore, *Anicetus carolinensis* is hereby transferred to *Ammonoencyrtus*.

Genus *Ammonoencyrtus* De Santis

Ammonoencyrtus is placed in the Cerapterocerini, a loosely defined tribe that includes *Anicetus* Howard, *Paraceraptoceus* Girault, *Homosemion* Annecke, *Anasemion* Annecke, and others. The genera in this tribe are generally characterized by the possession of: antenna with scape flattened and triangular to subrectangular; funicle flattened, with 6 segments which are generally much wider than long (Figs. 1–2) and with a apically truncate, 3-segmented clava (some *Anicetus* may have the intersegmental sulci reduced so that the clava may appear 1-segmented, e.g., *A. chinensis* Girault as figured by Annecke 1967); frontovertex separated from the face by an inverted U-shaped carina or depression (Figs. 3–4) with the face below excavated; and forewing largely infuscate and usually with one or more hyaline areas (often with a hyaline band paralleling the tip of the wing, (Figs. 5–6) and the postmarginal vein present (barely produced in *Homosemion* and *Anicetus*). These genera are generally parasites or hyperparasites of soft scales (Coccidae).

Ammonoencyrtus is close to *Homosemion* and *Anicetus* but can be distinguished by: carina on frontovertex interrupted medially by the interscrobial prominence (Fig. 3) (carina separating vertex from face entire in other genera, (Fig. 4); and forewing basally with an infuscate area enclosing a hyaline triangular area below the parastigma and basal to the linea calva (Fig. 5). *Anicetus annulatus* Timberlake has a condition very similar to that of *A. carolinensis* and this character may prove of dubious value. Both *A. carolinensis* and *A. californicus* have distinct brown stripes that parallel the dorsal margin of the oral cavity contrasting with the lighter face below the toruli. De Santis (1963), in his redescription of *A. bonarensis*, does not mention this coloring. However, a series of three specimens in the National Museum of Natural History, Washington, D.C. (USNM) collected in Uruguay from *Saissetia oleae* that may rep-

resent an additional new species, do have a darkened area (stripe) under the toruli.

Little has been written about the males of *A. californicus* and *A. carolinensis*. They share the following characters: generally dark brown or black with metallic reflections on the head and thorax; antennae with 6 funiculars, all longer than wide and each with numerous setae which are longer than the width of the segment; mandibles tridentate; and forewings hyaline. The antennae and legs vary from yellow (*carolinensis*) to brown (*californicus*). These characters agree with the illustrations and description of males of *bonarensis* given by De Santis (1964).

Ammonoencyrtus was described by De Santis (1964) with *Cerapterocerus bonarensis* (Brèthes) as type species. *Eusemion californicum* Compere was transferred to *Ammonoencyrtus* by Annecke (1967).

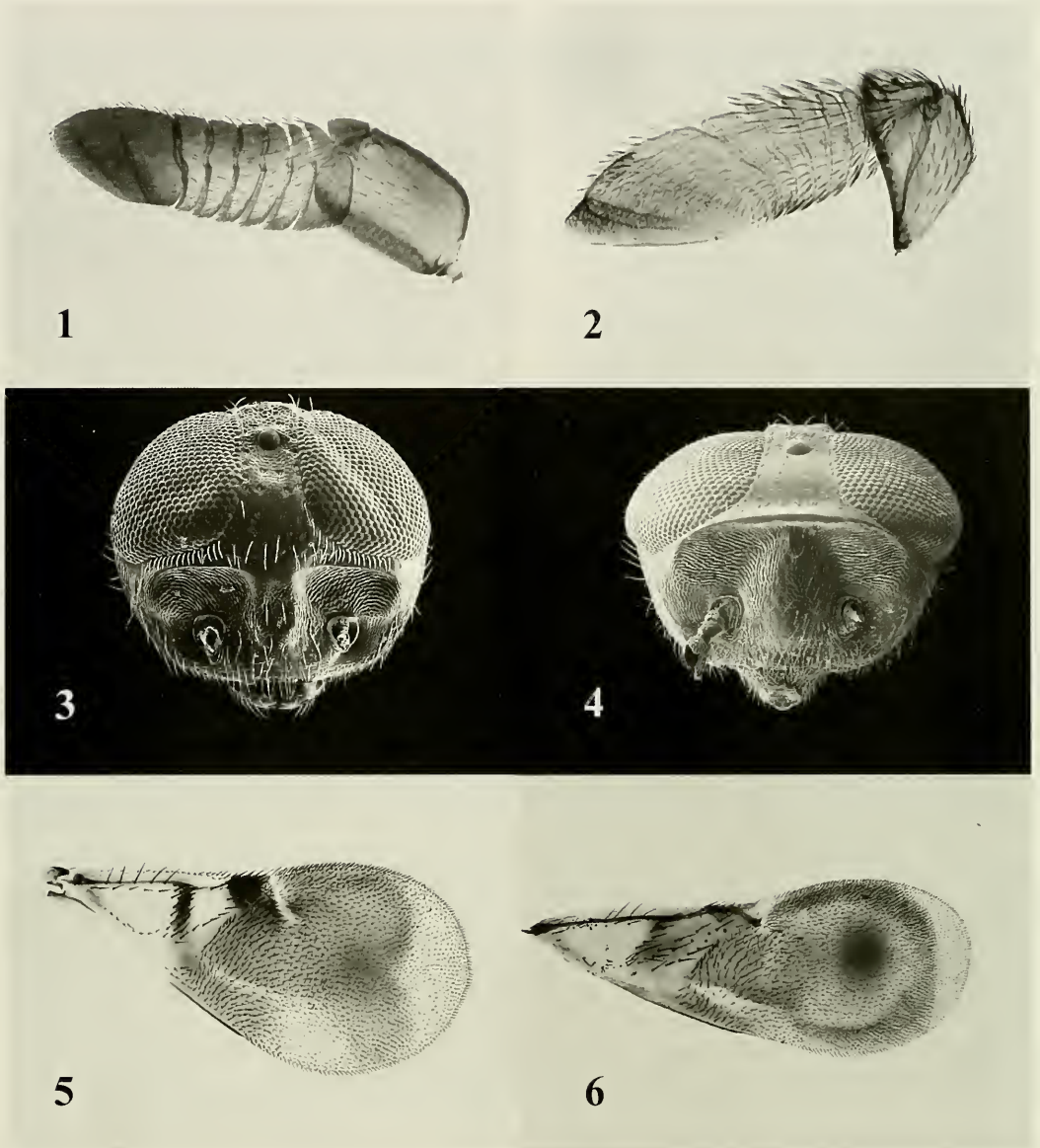
Ammonoencyrtus carolinensis (Meyer),
new combination
 (Figs. 1, 3, 5)

Anicetus carolinensis Meyer 2001: 687.

Diagnosis.—*Anicetus carolinensis*, was described from North Carolina, as a parasite of terrapin scale (*Mesolecanium nigrofasciatum* (Pergande) (Coccidae)), and is found on fruit trees and shrubs in southeastern U.S. It can be separated from the other known North American species (*A. californicus*) by the following: antennae, face, vertex, and dorsal thorax mostly honey yellow, mesoscutum sometimes darker and with metallic purplish reflection (dark brown to black in *A. californicus*); and femora and tibiae honey yellow (at least partly dark brown in *californicus* and *bonarensis*)

Distribution.—North Carolina, Florida, Virginia. The Virginia record is heretofore unreported, but a female specimen was collected by D. R. Smith in a Malaise trap in Fairfax Co., VA, in 1989 (USNM).

Discussion.—Use of the lobate lac scale as a host by *A. carolinensis* is unusual. The other hosts known for this genus are soft



Figs. 1–6. 1, 3, 5, *Ammonoencyrtus carolinensis*, female. 1, Antenna. 3, Face. 5, Fore wing. 2, 4, 6, *Anicetus dodonia* Ferrière, female. 2, Antenna. 4, Face. 6, Fore wing.

scales (Coccidae), and I must assume that *A. carolinensis* has crossed over onto the invasive *P. lobata* from its native hosts. As noted by Meyer et al. (2001), *A. carolinensis* was only reared from *Mesolecanium nigrofasciatum*, but it would oviposit in other soft scales with no further development. That this species could complete develop-

ment in an introduced species from another family of scales is contrary to what might be expected. While only a few *A. carolinensis* have been reared from thousands of lobate lac scale examined (F. W. Howard, personal communication) it has been reared from more than one scale specimen and seems to be a primary parasite. At least one

individual was dissected directly from inside the body of a *P. lobata* (F. W. Howard, personal communication) so the possibility of an error in the rearing seems unlikely.

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